

The internationalisation of international co-inventions

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Patents are a vested right to grant a temporary monopoly on the use of a certain technology or technological solution. Patents are one – among others – output of R&D processes and can, therefore, be interpreted as an innovation indicator of technologically oriented research and development activities. However, they are also a promise to the future as they are input to future market activities – at least on technology oriented markets.

The nationality of patents can be measured in three dimensions: 1) The country of the applicant, 2) the country of the inventors and finally 3) the “nationality” of the offices where the application is filed. The latter approach is the core of this paper with a special focus on internationally co-invented technologies.

Guellec and van Pottelberghe (2001; 2004) have suggested to analyse combinations of the first two dimensions by looking at international ownership (applicant dimension) of national inventions (inventor dimension) as well as national ownership of international inventions (see also OECD 2008). Edler et al (2003) have applied a similar approach to analyse the internationalisation of research in Multinational Enterprises (MNEs) in Germany.

A very frequently used approach to analyse international knowledge flows and collaborations is the use of international co-patents in terms of inventor dimension (or co-inventions) (Ejeremo, Karlsson 2006; Frietsch, Schmoch 2006; Hagedoorn et al. 2003; OECD 2008). However, co-inventions also reflect the organisation of research teams within MNEs, which account for the majority of patents as well as for the majority of international co-inventions. In any case, motives to collaborate are the access to complementary knowledge or the access to research facilities, instruments or results – so co-inventions are capable of international knowledge flows (though the direction of these flows cannot be detected) (Fraunhofer ISI, 2008).

Patel and Frietsch (2007) have analysed the patent applications of a selected set of MNEs to examine, if the inventor country can be used as an indication of R&D activities at the micro level. Next to the feasibility of this approach the study showed considerable differences in the internationalisation (inventor dimension) between Asian and Western enterprises (applicant dimension). Furthermore, some connection between inventor countries and filing countries (office dimension) became obvious.

The main questions to be addressed by this paper are:

- 1) Are internationally co-invented patents targeting more international markets (defined by the auspices of patent offices)?
- 2) Are internationally co-invented patents targeting more important markets like USA, Japan, Germany, UK, France, China etc.)?

Against the above mentioned background this paper analyses the filing structure of internationally co-invented patent families. The data source is the Fraunhofer ISI file of the so called PATSTAT database¹. International co-inventions are patents where at least two inventors from two different countries were involved. A patent family is the set of patents that share the same priority document (worldwide first application) – this is the simplest definition of patent families. In the smallest case this family only consists of the priority document itself. This definition has its strength in its simplicity, though it excludes all those patent documents with missing priority information, circular referencing or mistaken priority numbers. However, about 90% of all patent documents fit this definition. As patent families are in a constant flux – at least those of the latest 3-5 priority years –, we analyse documents at different stages of their aging process. We compare three different groups of priority years, namely 1995-1997, 1999-2001, and 2004-2006.

This is work in progress, so final results cannot be given yet. First analyses indicate that internationally co-invented patents indeed are more often filed internationally compared to pure national inventions. However, it also seems that first of all the inventor countries are also approached as target markets. This could be interpreted as a proof of complementary knowledge seeking, but further analyses are necessary to support this very preliminary result. When successfully pursued, this study will shed new lights on the relationship between internationalisation of R&D process and management of its outputs in international markets.

Literature

- Edler, J.; Döhrn, R.; Rothgang, M. (2003): Internationalisierung industrieller Forschung und grenzüberschreitendes Wissensmanagement - Eine empirische Analyse aus der Perspektive des Standortes Deutschland, Technik, Wirtschaft und Politik, Fraunhofer ISI, Heidelberg: Physica-Verlag.
- Ejermo, O.; Karlsson, C. (2006): Interregional inventor networks as studied by patent coinventorships. In: Research Policy, 35, pp. 412-430.
- Fraunhofer ISI, (2008): Co-patenting Indicators, unpublished manuscripts
- Frietsch, R.; Schmoch, U. (2006): Technological Structures and Performance Reflected by Patent Indicators In: Schmoch, U.; Rammer, C.; Legler, H. (eds.): National Systems of Innovation in Comparison. Structure and Performance Indicators for Knowledge Societies. Dordrecht: Springer.
- Guellec, D.; van Pottelsberghe de la Potterie, B. (2001): The internationalisation of technology analysed with patent data. In: Research Policy, 30, pp. 1253-1266.
- Guellec, D.; van Pottelsberghe de la Potterie, B. (2004): Measuring the Internationalization of the Generation of Knowledge: An approach based on patent data In: Moed, H.F.; Glänzel, W.; Schmoch, U. (eds.): Handbook of Quantitative Science and Technology Research. The Use of Publications and Patent Statistics in Studies of S&T Systems. Dordrecht: Kluwer Academic Publisher, pp. 1-15.
- Hagedoorn, J.; van Kranenburg, H.; Osborn, R.N. (2003): Joint Patenting Amongst Companies - Exploring the Effects of Inter-Firm R&D Partnering and Experience. In: Managerial and Decision Economics, 24, pp. 71-84.
- OECD (ed.) (2008): Compendium of Patent Statistics 2008. Paris: OECD.
- Patel, P.; Frietsch, R. (2007): Exploratory study to test the feasibility of using Patent data for monitoring the Globalization of R&D, Report to IPTS by the ERAWATCH Networks ASBL within the Framework Service Contract Nr -150176-2005-F1SC-BE, Brighton/Karlsruhe: SPRU/Fraunhofer ISI.

¹ Worldwide patent database of the European Patent Office (PATSTAT).